BRYOZOA

BY

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Swedish Deep-Sea Expedition in 1947—
obtained material of three Bryozoan spe-
now preserved at the Natural History
m in Gothenburg and kindly placed at
sposal by the zoological member of the
tion, Dr. O. NYBELIN, director of the
m. They belong to the Gymnolaematous
es Farciminariidae and Bicellariellidae
present characteristic abyssal types pre-
y described.

y were all obtained at the same station
7 (Haul No. 13), N 40° 33′ W 35° 24′—
34′ W 35° 52′, Sept. 7th 1948; depth
–4,600 m.

trawl reached the deck in the night and
small specimens adhering to its meshes
ot detected before dawn on the next day.
were then already dry. Among them
he specimens of *Himantozoum* and *Cornu-*
recorded below, which, consequently,
t in a good state.

Fam. FARCIMINARIIDAE

Levinsenella magna (Busk)

Fig. 1.

inaria magna, BUSK 1884, p. 49, Pl. V fig. 1,
XXI fig. 1 (Antarctic Sea, 3,065 m, and Atlantic
Montevideo, 3,477 and 4,850 m); KLUGE 1914, p.
Pl. XXVIII fig. 8 (Antarctic Sea, 3,397 m);
nella magna, HARMER 1926, p. 402 (synonymy);
NBANK 1932, p. 343 (Indian Ocean off East Africa,
m); HASTINGS 1943, p. 393 (synonymy).

species is represented by a beautiful
m reaching a height of 18 cm, a small,
rod-like zoarium, and a detached branch.
characters of the autozoids as well as
avicularia coincide in all details with
escriptions given by BUSK and other authors. The avicularia are unusually numerous, being present at almost all autozoids. There is some uncertainty about the determination, as ooecia the structure of which provides the most conclusive characteristics in this genus, are absent (as in KLUGE's material). Considering the large size and, presumably, considerable age of the large zoarium the idea might even occur that the absence of these represents a permanent condition. However, nothing can be stated with certainty about this at present, for want of any corroborative evidence.

All the previous localities of the species are in the southern hemisphere.

Fam. BICELLARIELLIDAE

Himantozoum mirabile (Busk)

Bugula mirabilis, BUSK 1881, p. 12, and 1884, p. 39, Pl. X fig. 1 (N. Atlantic, 4,390 m);
Himantozoum mirabile, HARMER 1923, p. 311, and 1926, p. 453.

Two large fragments, dry. The correspondence with BUSK's description is complete.

The previous locality is situated to the east of the mid-Atlantic ridge, the present one to the west of it.

The genus *Himantozoum* is traditionally referred to the Bicellariellidae. This classification seems rather questionable to the present author. Two features are, in particular, to be considered. (1) The curious appearance of fertile zoids (with less or more or entirely reduced ooecia) exclusively in the median zoid rows of the zoarium, where, on the other side, all the zoids seem to be fertile. This

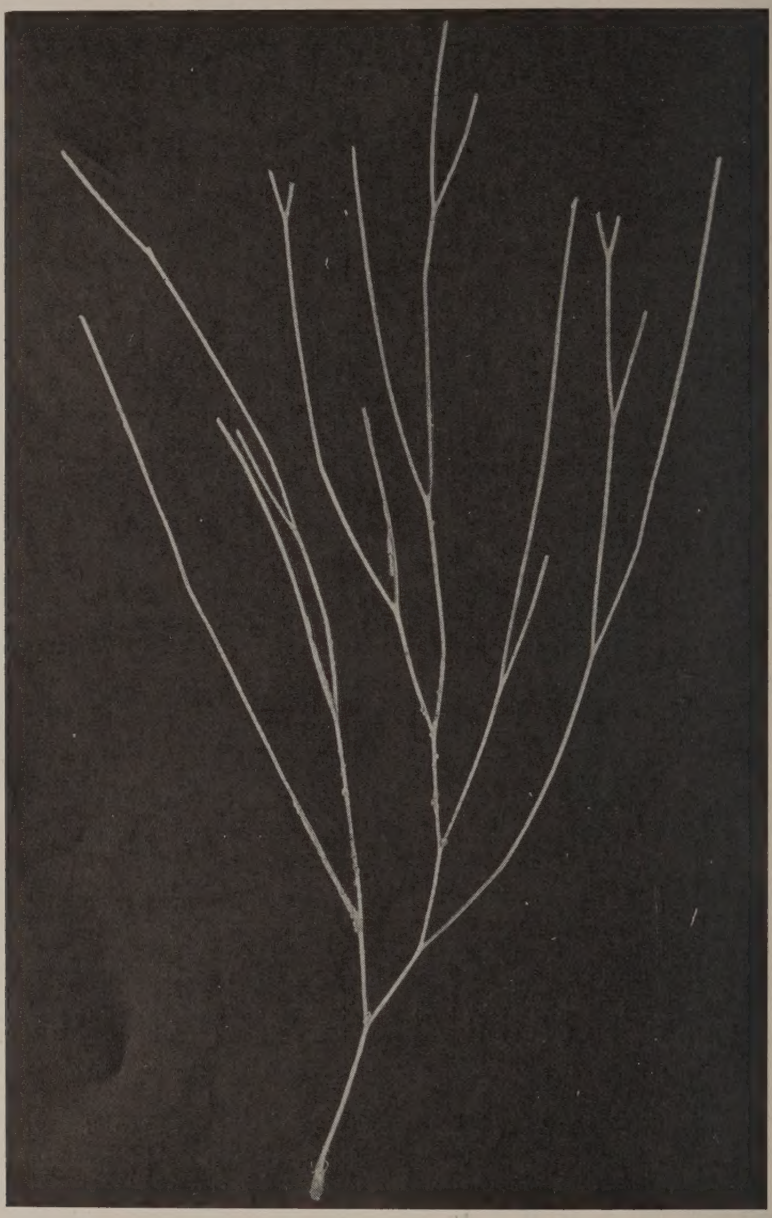

Fig. 1. *Levinsenella magna* (BUSK), the large zoarium. Nat. size.

striking phenomenon is characteristic of the only forms provided with flat branches belonging to the Farciminariidae — thus all the Farciminariidae in which such a phenomenon can appear — viz. the genera *Farciminellum* and *Didymozoum*. As far as I know it has not been observed in the remaining Bicellariellidae or any other Bryozoa. (2) The avicularia agree as to their characteristic with those of the Farciminariidae and distinctly from those of the Bicellariell general. — The presence of well-chi opercula in *Himantozoum* rather points Farciminariidae, taking into account t neral absence of opercula in the Bicellari However, this is not conclusive, as

ıla are met with in some few species of atter family as well. — The general ure of the autozoid and the zoarium, g aside the position of the fertile zoids, s no clear clue. However, it coincides he Farciminariidan characters (cf. parti- *Farciminellum* and *Didymozoum*) at as well as with the Bicellariellidan ones. e writer has failed to find a direct state- on the nature of the usually strongly d ooecia present in three species included *nantozoum*. They are possibly not »ento- « as are the ooecia hitherto described Farciminariidae. However, even if they ally »hyperstomial», I am not convinced his ought to be taken as a proof against inities of *Himantozoum* with this family, ave tried to demonstrate, in a different tion (SILÉN 1944), that the classifica- f ooecia into »entozoidal» and »hyperstо- is artificial, having been founded on prehensions about their development and ure. — Though the matter seems rather I nevertheless confine my conclusions general suggestion, as I have not had disposal any material of *Farciminellum*, *ozoum*, and *Himantozoum* other than esent, imperfect one. — Dates for the nt members of *Himantozoum* are given, all, by HARMER (1923, p. 311, and pp. 453 ff.) and HASTINGS (1943, pp.).

Cornucopina rotundata (Kluge)

a rotundata, KLUGE 1914, p. 640, Pl. XXXIII (Antarctic Sea, 3,397 and 3,423 m);
pina rotundata, HARMER 1926, p. 422; HASTINGS p. 407 (synonymy);
a navicularis (part), BUSK 1884, p. 32 (specimen St. 332, Antarctic Sea, 4,026 m; *fide* HASTINGS).

zoarium and two fragments possibly ing to the same zoarium. Owing to rivelled and fragile state all of the earing processes are more or less in- te. Further, only one badly preserved rium is present. Nevertheless, the general features of the zoids, their aperture-fields and processes make it clear that this material is, in all probability, to be referred to *C. rotundata*. Theoretically it might be surmised that features have been destroyed by its bad preservation that would have shown its position as a separate species closely related to *C. rotundata*, though this possibility seems very small. It is quite distinct from all other known members of the genus. — Ooecia are absent.

The species is previously known only from the southern hemisphere.

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A list of the Bryozoa recorded from depths below 3000 m has been compiled as follows, in accordance with a general recommendation set up for the treatises on the zoological results of the expedition.

Surveys of the bathymetrical distribution of Bryozoa of more than one expedition are rare. AGASSIZ (1888) has devoted to the Bryozoa a few pages of his treatise on »Characteristic deep-sea types». That paper, however, is of a popular character and contains only some few examples. CORI (1941, p. 432) lays stress upon the fact that comparatively very few Bryozoa have been collected below 1000 m. The deepest localities mentioned by him are of depths between 1300 and 1557 m. This may be a little misleading as numerous Bryozoa have been obtained at much greater depths as is seen from, among other, the present list. HASTINGS (1943, p. 485) has published a table including 18 species of »Cellularine» Bryozoa known from abyssal stations (below 2000 m) within the Antarctic and sub-Antarctic areas. In the same work (pp. 493—495) there are maps illuminating the geographical distribution of the partly abyssal genera *Camptoplites*, *Farciminellum*, *Himantozoum*, *Cornucopina*, *Notoplites*, and *Amastigia*, and to a certain degree indicating their bathymetrical distribution as

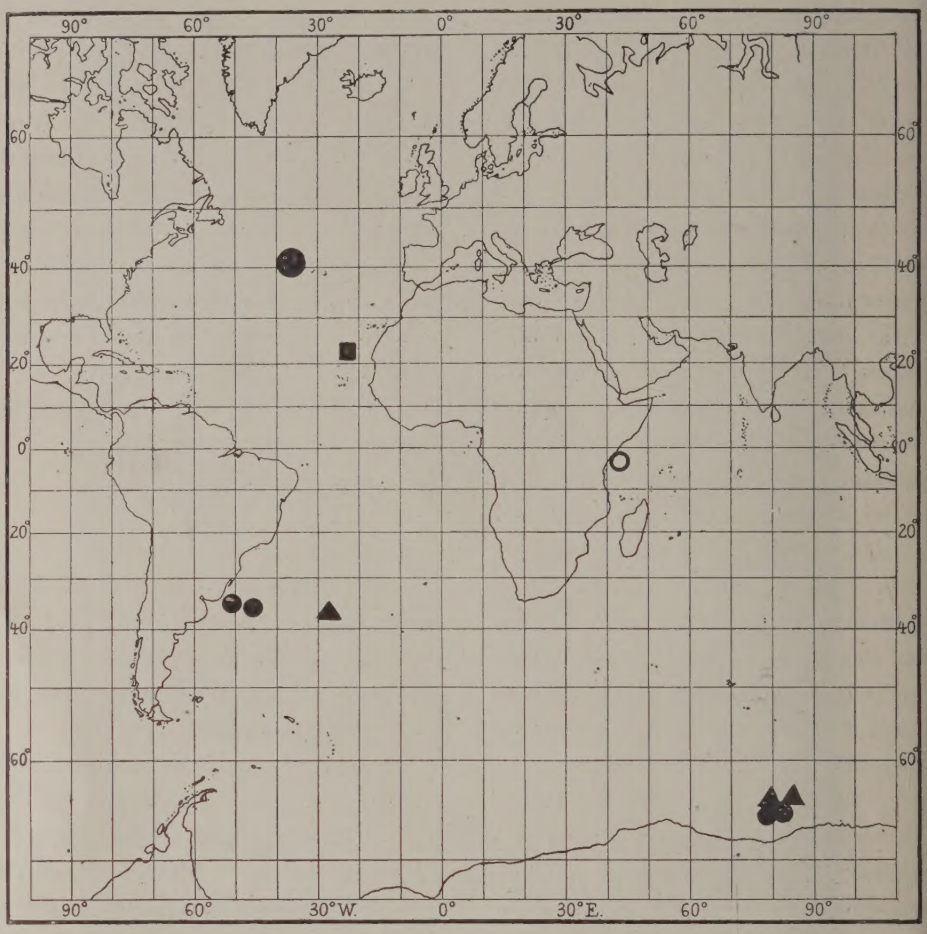

Fig. 2. Map to show the position of station 387 of the Swedish Deep-Sea Exp. (large circle), at which the three treated here were obtained, as well as of previous localities for *Levinsenella magna* (small circles), *Himantozoum* (square), and *Cornucopina rotundata* (triangles). Localities with depths greater than 3,000 m are indicated by bla the single one with less depth by a white sign.

well, which is further commented upon in the text.

The present list calls for a few remarks.

In the list are recorded: the species and their respective families; the depths of all the localities below 3,000 m at which they have been obtained; in a very general way the areas within which they have been found below 3,000 m in order to give some idea of their distribution at this depth (N. and S. Atlantic as well as N. and S. Pacific meaning the parts of these seas situated to the north and the south respectively of the equator); the expeditions that captured them and the authors who reported on them, both c referring to the localities below 3,000 r finally, the least depth above the 3 limit, if any, from which they have b corded, in order to give some idea c more or less exclusively abyssal charact

The modern nomenclature has been a for the names of the species in the case they have been treated in more recent ture.

The figures for depth of the »Challeng »Ingolf» expeditions were originally g fathoms. They have been changed into by multiplying by 1.83.

somewhat formal nature of the list is
by the fact that it includes species
stations where the depth has varied
above to below the 3,000 m limit
ut any indication of the exact depth of
abitat of the Bryozoa obtained, whereas
s from, for instance, the »Challenger»
n 147 with a depth of 2,938 m are omitted.
discrepancies can, of course, never be
ed whatever principle is used in the
uction of the list.

knowledge of the abyssal Bryozoa is
nly too imperfect as yet — with regard
number of the forms as well as to their
bution in the great depths — to allow
y definite conclusions. Nevertheless, it
be observed from the list that whilst
l of the forms included are merely isolated
entatives of groups with a main distri-
n in shallow water or even themselves
it a wide bathymetrical range, abyssal
are strikingly common in the families
ocellariidae, Bicellariellidae and Far-
ariidae. They are there concentrated
n special genera, a thing that would have been even more evident if species from up to 2,000 or 1,000 m had been included. The family Farciminariidae (and, in particular, its genus *Levinsenella*) holds a separate position in so far as the vast majority of its members are abyssal. — None of the eight *Bifaxariae* described from the »Challenger» material was collected above 630 m. One or two members of this little-known group are nowadays referred to other groups.

In some of the cases where a species has been reported to have a very wide bathymetrical range the suspicion lingers that a confusion of species may have taken place.

All of the 48 forms included in the list belong to the Gymnolaematous groups usually classed together as the »Cheilostomata», no less than 39 of them to the »Anasca» and only 9 to the »Ascophora». A curious feature is that no »Ctenostomata» or Cyclostomata (Stenolaemata) have been found in these great depths. The former group seems to be wholly restricted to quite shallow water. Of the latter very few species are reported from depths below 1,000 m.

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LIST OF THE SPECIES OF BRYOZOANS RECORDED FROM DEPTHS OF MORE THAN 3,000 M

Family and species	Depth in m	Area	Exp.	Author	Least in
Membraniporidae:					
Acanthodesia arctata Harmer.....	2,798—3,112	Malay Archip.	Siboga	Harmer 1926, p. 219	1,
Family? (cf. Harmer 1926, p. 264):					
Heliodoma implicata Calvet.....	3,700	N. Atlantic	Travailleur	Calvet 1907, p. 396	
Lunulariidae:					
Setosella vulnerata (Busk).....	3,700	N. Atlantic	Travailleur	Calvet 1907, p. 394	
S. folini Jullien	3,700	N. Atlantic	Travailleur	Calvet 1907, p. 395	
Chlidoniidae:					
Crepis decussata Harmer, »form B»	2,798—3,112	Malay Archip.	Siboga	Harmer 1926, p. 320	1, (»form
Aspidostomatidae:					
Euginoma vermiformis Jullien....	3,700	N. Atlantic	Travailleur	Calvet 1907, p. 402	1,
Cellariidae:					
Cellaria biseriata Maplestone.....	3,530	N. Atlantic	Talisman	Calvet 1907, p. 401	2,
C. magnifica (Busk).....	3,477, 3,599	N. Atlantic	Challenger	Busk 1884, p. 93	
[*C. salicornia* (Pall.)[1])	3,700	N. Atlantic	Travailleur	Calvet 1907, p. 401	
Scrupocellariidae:					
Amastigia pateriformis (Busk)....	3,953	S. Pacific	Challenger	Busk 1884, p. 22	
Notoplites crateriformis (Busk)....	3,477, 4,850	S. Atlantic	Challenger	Busk 1884, p. 16	
N. marsupiatus (Jullien).....	3,065, 3,690	N. Atlantic	Challenger	Busk 1884, p. 20; Waters 1888, p. 9	
Tricellaria sp.	3,953	S. Pacific	Challenger	Hastings 1943, p. 359	
Canda simplex Busk	3,111	N. Atlantic	Challenger	Busk 1884, p. 26	
Farciminariidae:					
Levinsenella borealis (Lev.)	3,138	N. Atlantic	Ingolf	Levinsen 1909, p. 117	
L. carinata Harmer.....	2,798—3,112	Malay Archip.	Siboga	Harmer 1926, p. 403	
L. cribraria (Busk).....	3,477	S. Atlantic	Challenger	Busk 1884, p. 49	
L. delicatissima (Busk)	3,416, 3,477, 3,599, 3,983, 4,392, 5,063?	N. Atlantic	Challenger	Busk 1884, p. 51	
L. gracilis (Busk).....	3,065	N. Atlantic	Challenger	Busk 1884, p. 51	
L. magna (Busk)	3,065, 3,397, 3,477, 4,540—4,600, 4,850	N. and S. Atlantic, Antarctic Sea	Challenger, Gauss, Sw. Deep-Sea Exp.	Busk 1884, p. 49; Kluge 1914, p. 650; the present paper	1,
L. pacifica (Busk)	4,209	N. Pacific	Challenger	Busk 1884, p. 50	
Farciminellum hexagonum (Busk)	2,798—3,112	Malay Archip.	Siboga	Harmer 1926, p. 405	
Kenella biseriata (Busk).....	3,953	S. Pacific	Challenger	Busk 1884, p. 54	1,
Bicellariellidae:					
Cornucopina infundibulata (Busk)	3,614	Antarctic Sea	Challenger	Busk 1884, p. 33	2,
C. rotundata (Kluge).....	3,397, 3,423, 4,026, 4,540—4,600	N. and S. Atlantic, Antarctic Sea	Challenger, Gauss, Sw. Deep-Sea Exp.	Busk 1884, p. 32; Kluge 1914, p. 640; the present paper	

[1]) »Ces divers échantillons, ramenés par la drague à l'état de squelettes, avaient été entraînés dans ces deurs par les courants sousmarins. La *Cellularia fistulosa* est, en effet, une espèce côtière qui ne dépasse les fonds de 200 mètres.» (Calvet, l.c.)

Family and species	Depth in m	Area	Exp.	Author	Least depth in m
ntozoum margaritiferum					
sk)	3,477, 4,026	S. Atlantic	Challenger	Busk 1884, p. 41	
irabile (Busk)	4,392, 4,540—4,600	N. Atlantic	Challenger, Sw. Deep-Sea Exp.	Busk 1884, p. 39; the present paper	
nuosum (Busk)	3,397	Antarctic Sea	Gauss	Kluge 1914, p. 632	146
nuosum var. *variabilis* (Kluge)					
rt)	3,397	Antarctic Sea	Gauss	Kluge 1914, p. 632	
la neritina (L.)[1]	4,060	N. Atlantic	Talisman	Calvet 1907, p. 379	0]
toplites bicornis (Busk)[2]	3,568	Antarctic Sea	Challenger	Busk 1884, p. 40	
iculatus (Busk)	3,953	S. Pacific	Challenger	Busk 1884, p. 40	1,080
iculatus var. *unicornis* (Busk)	3,416, 3,983,	N. Atlantic	Challenger	Busk 1884, p. 40	
oskias cyathus (W. Thomson)	4,850	S. Atlantic	Challenger	Busk 1884, p. 44	2,750
ngata Harmer	2,798—3,112	Malay Archip.	Siboga	Harmer 1926, p. 469	798
cillum Busk	3,953	S. Pacific	Challenger	Busk 1884, p. 45	60
chnopusiidae:					
nopusia monoceros (Busk)[3]	5,719	N. Pacific	Challenger	Busk 1884, p. 133	9
erodomidae:					
rodoma gracile (M. Sars)	3,477, 3,700	N. Atlantic	Challenger, Travailleur	Busk 1884, p. 174; Calvet 1907, p. 405	29
choporidae:					
llia sinclairi (Busk)	3,599	Indic	Challenger	Busk 1884, p. 103	45
axariidae:					
aria abyssicola Busk	5,719	N. Pacific	Challenger	Busk 1884, p. 82	
inuta Busk	3,065	N. Atlantic	Challenger	Busk 1884, p. 81	
ticulata Busk	3,477	N. Atlantic	Challenger	Busk 1884, p. 82	
riozoidae:					
ozoum strangulatum Calvet	3,700	N. Atlantic	Travailleur	Calvet 1907, p. 427	636
nily? (cf. Silén 1947, p. 52):					
a ewarsi Jullien	3,700	N. Atlantic	Travailleur	Calvet 1907, p. 426	825
leporidae:					
pora» solida Busk	4,758	Antarctic Sea	Challenger	Busk 1884, p. 200	
ecies incertae sedis:					
la johnstoniae?»	5,719	N. Pacific	Challenger	Busk 1884, p. XV	
simplex Busk (part)[4]	3,065	N. Atlantic	Challenger	Busk 1884, p. 27	
actella sp.»	5,719	N. Pacific	Challenger	Busk 1884, p. XV	

[1] *Bugula neritina* est une espèce essentiellement côtière, et, . . . , il faut croire qu'elle y avait été entraînée par tions extérieures.» (Calvet, l.c.).

[2] orms described as varieties of this species are distributed up to shallow water.

[3] ccording to Jullien (1888, p. 63) this specimen would be »sans doute morte et charriée». He has probably into regard the general distribution of the species in shallow water. On the other hand, the fact seems considering that the specimen is reported by Busk to be attached to a manganese nodule.

[4] he taxonomic position of the present specimens is doubtful according to Harmer (1926, p. 220).